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                                          CDR1                    CDR2                                  CDR3
CONS     MAWSPLLLTLIALCT---GSWAQS-LTQPASVSGTLGQTVTISCSGSSS-NIGVG----YVGWYQQIPGTAPKTLIYGNNKRASGVPDRFSGSKSGNTATLTISGLQAEDEADYYCGSYDSSDSSA---FGGGTHLTIA    IGLV
IGLVJ13  ...T....L.LT...-----..V.S.M...LTL.VAF.S....T.Q.ELL-DSY------.AE....K.DQ..VLV..YGS..P..IST.....Y.SKM.....L..AL.........QVW...GNQY--I..S....SVL    IGLV2-41
IGLVJ1   ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF.------S...K..Q..VLV.DPS.E.H..I.E......S..D.S......A........LAV.ALS.ET-YI..S....SVL    IGLV4-66
IGLVJ2   ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YE.-YI..S....SVL    IGLV4-66
IGLVJ3   ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A.VGA----......    IGLV4-66
IGLVJ11  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GDF-ESF..------S...K..Q..VLV.DAS.E.P..I.E......S..D.......A........LAA.A..-----I......SVL    IGLV4-66
IGLVJ12  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YDI----....SVL    IGLV4-66
IGLVJ4   ...T....AFLT..----.PM.S.EV...SA..VA....A.LT.Q.DYY-ERYI------.N...K..Q..VLV..A.SE.P..I.E......S.LG.S.....A........QPA.AHS.DG--A......    IGLV4-69
IGLVJ5   ...T....AFLS..----.PVVS.AV...SE..VA...RA.LT.Q..NF-EFFS------PS...K..Q..VL..NI..E.H..I.E......S..D.S......A........LAV.ALS.ET-YI......SVL    IGLV4-75
IGLVJ14  ...T....AFLS..----.PVVS.AV...SE..VA...RA.LT.Q..NF-EFFS------PS...K..Q..VL..NI..E.H..I.E......S..D.S......A........LAV.ALS.ET---I......    IGLV4-75
IGLVJ15  ...T....AFLS..----.PVVS.AV...SE..VA...RA.LT.Q..NF-EFFS------PS...K..Q..VL..NI..E.H..I.E......S..D.S......A........LAV.ALS.ES--A......SVL    IGLV4-75
IGLVJ16  ...ALF.I..LTQG.-----..G..A.I...S...VA....S....A....-D--I.YY-NSIS....H...T.L...YT..KH..I........S..........E...C..AG.GNF.----........    IGLV6-98
IGLVJ6   ....................-----..F.......-V.---------......--I.NSYS...F....................................V...........S..-----.......    IGLV8-128
IGLVJ17  ....................-----....R...-V.------.....-..V.S.-----.S...........L...YATS.........TR...............V..........TSG..W..D-GA......    IGLV8-133
IGLVJ18  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..D--I......SVL    IGLV8-24
IGLVJ19  ....................-----...-V.------....T.....-.VA------.........A...............S....T......TSS..G.AV---......    IGLV8-24
IGLVJ20  ...C................-----...-V.------....T.T...-.VA------....................................Y...V--V.......    IGLV8-24
IGLVJ7   ....................-----............-..-I.YSYSA........AT.......................SY.....D--I..S....SVL    IGLV8-20
IGLVJ8   ....................-----............-..-I.YSYSA........AT.......................SY....D-GA......    IGLV8-20
IGLVJ9   ....................-----............-..-I.YSYSA........AT.......................SY....I.---......    IGLV8-20
IGLVJ10  ....................-----............-..-I.YSYSA...........................Y....G--A......    IGLV8-12
IGLVJ21  ....................-----............-..-I.YSYSA...........................Y...AV----......    IGLV8-12
IGLVJ22  ....................-----............-..-I.YSYSA...........................Y....----......    IGLV8-12

IGLVJ23  ...T....L.LT...-----..V.S.M...LTL.VAF.S....T.Q.ELL-DSY------.AE....K.DQ..VLV..YGS..P..IST.....Y.SKM.....L..AL.........QVW...GNQY--I..S....SVL    IGLV2-41
IGLVJ24  ...T....L.LT...-----..V.S.M...LTL.VAF.S....T.Q.ELL-DSY------.AE....K.DQ..VLV..YGS..P..IST.....Y.SKM.....L..AL.........QVW...GNQY--I..S....SVL    IGLV2-41
IGLVJ25  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YG......    IGLV4-66
IGLVJ26  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..GA-----....Q...    IGLV4-66
IGLVJ27  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YAV----......    IGLV4-66
IGLVJ33  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GDF-ESF..------S...K..Q..VLV.DAS.E.P..I.E......S..D.......A........LAA.A..-----I......SVL    IGLV4-66
IGLVJ34  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GDF-ESF..------S...K..Q..VLV.DAS.E.P..I.E......S..D.......A........LAA.A..-----I......SVL    IGLV4-66
IGLVJ43  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YE.-SI.S....SVL    IGLV4-66
IGLVJ45  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..R.LT.DPS.E.P..I.E......ER.I..DYI....A........LAA.A..YE.-SA......    IGLV4-66
IGLVJ46  ...T....AFLT..----.PV.S.K...S...VA....A.T.K.GNF-ESF..------S...K..Q..VLV.DPS.E.P..I.E......S..D.......A........LAA.A..YE.--A......    IGLV4-66
IGLVJ47  ...T....AFLS..----.PVVS.AV...SE..VA...RA.LT.Q..NF-EFFS------PS...K..Q..VL..NI..E.H..I.E......S..D.S.............LAV.ALS.EI--V......    IGLV4-75
IGLVJ48  ...T....AFLS..----.PVVS.AV...SE..VA...RA.LT.Q..NF-EFFS------PS...K..Q..VL..NI..E.H..I.E......S..D.S.............LAV.ALS.EI-FV......    IGLV4-75
IGLVJ28  ...ALF.I..LTQG.-----..G..A.I...S...VA....S....A....-D--I.YY-NSIS....H...T.L...YT..KH..I........S..........E...C..AG.GNF.----........    IGLV6-98
IGLVJ35  ....................-----............-.-.NSYS...S.F....................................V...........AAG..LNG..-V......    IGLV8-122
IGLVJ36  ...C................-----...-V.------........YSSS--..S.F...............YATS.............R........V..........S.A..LR.D--V......    IGLV8-122
IGLVJ37  ....................-----............-.-.YSYS--..F...........................................Y....V--V......    IGLV8-128
IGLVJ29  ....................-----...-V.------....T.I...-------.D........I..AT..QP.............T..............I....L......    IGLV8-137
IGLVJ38  ....................-----............-..T...-S..S-----.M................AT.......................T.............Y...A----V......    IGLV8-28
IGLVJ39  ....................-----............-..T...-S..S-----.M................AT.......................T.............Y...G.---......    IGLV8-28
IGLVJ40  ....................-----............-..T...-S..S-----.M................AT.......................T.............Y...D--V......    IGLV8-28
IGLVJ49  ....................-----....R..-V.------.....-.S.----H.S...........R...SSAS.........R..............TLY..W...-V......    IGLV8-26
IGLVJ30  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..--V......    IGLV8-24
IGLVJ31  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..--V......    IGLV8-24
IGLVJ41  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..--V......    IGLV8-24
IGLVJ42  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..--V......    IGLV8-24
IGLVJ50  ...C................-----...-V.------....T.T...-.VA------.........A...............S....T......TSS..G..DHGA......    IGLV8-24
IGLVJ51  ....................-----............-.-.YSYS--A.......AT.......................SY....G..---......    IGLV8-20
IGLVJ52  ....................-----............-..-I.YSYSA........AT.......................SY....D-GA......    IGLV8-20
IGLVJ32  ....................-----............-..-I.YSYSA...........................Y...GA----......    IGLV8-12
IGLVJ53  ....................-----............-.-.YSYS--A...........................Y...A-----......    IGLV8-12

IGLVJ75  ...TL....LTQG.-----.......A........A...S..T.G....D..AFD---A.S.L..Y.....V...SKET.....I...........Y.....V....I....Y.LVEKYHYK----.......VIVL    IGLV6-101
IGLVJ65  .T.AL..I..FTQG.-----.......A........S....A..GD-D..KW----DL.S..R.Y..A...L..HQVSL..G.I.A......V...Y.V.E......E.F.A.RG.EG.AV----......    IGLV6-109
IGLVJ54  ....................-----............-.....NHDS--M.....V..........D.R...T......V...V......SAG...R.A.---......    IGLV8-122
IGLVJ66  ........I...S..-----...-............-D.........T...-.WSKD--..S.F..R.......SATI............R...M.....V....V...S.P.ILLR.V--V.....V.    IGLV8-122
IGLVJ76  ....................-----....R......L..........-.SDET--T.S...........L..EDSV.G.........W...........A.SV......SVGNENGNTE---..P.....    IGLV8-122
IGLVJ77  ........F............-----............-......R..-.WDGD--..T.F.HV.......SATS...............R..............V...S.A.R.LKTG--I......    IGLV8-122
IGLVJ78  ....................-----............-A.........-.AEAT--EI...EV..KGL..IY.LT.T......T...AR...........V....I..TAP.INEVTG---...VV    IGLV8-122
IGLVJ55  ........I............-----...-V.------......A.-..GSGN--..A..HR..E.......DQ.ET..Y.......S.....VT.V.D...F..TW..DQKTG--V.....V.    IGLV8-128
IGLVJ56  ....................-----...-V.------....Q.....R.-S..ASRS-GH............N.....D........................T.V...V...LT..VDLKTN--I......    IGLV8-128
IGLVJ57  ........T............-----............-A.........-......R----A..F.........S...............D......I.V.....AV..G.LRYV--V......    IGLV8-128
IGLVJ58  ....................-----...-V.------..........-.K.HS--..........S...............SS........T.V..D......K...LD.V--T......    IGLV8-128
IGLVJ59  ....................-----..-I.........-A---..D.PY--N...F..K......VHSTDT.........RT.........T.V...V....AF.RRE.YV---......D..    IGLV8-128
IGLVJ60  ....................-----...-V.------....T.T..GA-TLPTVVA--..A.K.V..P.....DK....A.........V...............S...ADSF----..L...V-    IGLV8-128
IGLVJ67  ....................-----...-V.------....D.......-GL-.TRDWIT--..A..VV..R.....W..DI..Q........R...........TE.........TV.NNVRN--DL.......E    IGLV8-128
IGLVJ68  ....................-----...-P.V.S....-......T.-.NSYG--..A.F...T..V.....SA.K.......S...A....T.......V.....A...NVVE.V--V......    IGLV8-128
IGLVJ69  ....................-----...-V.------..........S.-.T.N.-L.KDDS--.D.A.........L...GTGLGA...G.....V.........T.V.........ST...RLNIE---.......V    IGLV8-128
IGLVJ70  ....................-----...-V.------......R.-.SRDE--T..N.LV.V.....V...HT.....P..A....A.T.D.....V..V.....V.........N.LRIY--VI.......F.    IGLV8-128
IGLVJ71  ....................-----............-...-V.------.....SN----...F.........F...ET.........A.............I...........AA.D.SG.T--HI....Q...    IGLV8-128
IGLVJ72  ....................-----...-V.------.........NIGD-SDSD------.A.V.........L..R.VTA...I............S............S...ETR..-V--..S..    IGLV8-128
IGLVJ73  ........ALT.........-----...-V.------.....E.A.T..A.RDDYLLNDEYM.N.....V.....RI..SVAI.PE...K....R..KVF..........ATTS.VTKTG--V.......T    IGLV8-128
IGLVJ79  ........F............-----............-.........N.-.HSGN--...F..N...............R....AAR.........I.P...V.....TDS..D--V......S..    IGLV8-128
IGLVJ80  ....................-----...-A-VP...T..-I....K.........E.....QA--.HDVA--VG..F.KR..S..RL.T.TG.R.P.T.......ER.I..DYI...T...S....E.I.V.E.KGLE.Y--I..D..Y.S.S    IGLV8-128
IGLVJ81  ........F.A---.......-----...-V.....T....D...T.I.TRR----.GRLN------.....H...C....TD..V......AA..DTR........V.T.........ST..EENDTN--V....R..VT    IGLV8-128
IGLVJ82  ....................-----............-......I.-T..TS----S..F.........F..Q..........A..............V........ATR..GS.TS--V......    IGLV8-128
IGLVJ83  ....................-----...-V.V------.....S.....TTM-D..WKHN--I.V.F.S.........HYG.E.L..SE.....Q..........V.S...T...AC..R.SGLL--L....Y..L    IGLV8-128
IGLVJ84  ........F............-----............-........D.T-..DNRFN--K...F..M..K.......A.SL..T...............V.Y.........TT..T.SR.L--V......    IGLV8-128
IGLVJ61  ....................-----....R...-V.------........N.......-TD---L.S........V.S.......S....V...........V.........ASGDMW..DYDV.--V......    IGLV8-133
IGLVJ85  ........S...........-----...-.........E.............T....SSGSL------......P..L..FSSKE.........A.RT.A....T..R.......A.GSY---------....R....    IGLV8-28
IGLVJ62  ....................-----............-....T.T.NDG-GSVD------.A.........FW.GD....V...A.R..T........T---......F..ARGVGQT------......VL    IGLV8-24
IGLVJ63  ...C................-----....--ED----V.......A.....T.T.IE.-ADIED------.....HV...V.....WATKR...........T.......TR.KI...V...ASSADGAI.---.....D..LT    IGLV8-24
IGLVJ74  ....................-----......A.-V.......-...T.T.RNP-..VIE-----.......R.....MF.-.R..E.......A......S.....T...D.......VSGEGGA------....Q..V.    IGLV8-24
IGLVJ86  ....................-----...-V.......A.....V.T.R...A-S.VA-----........V.....NDDR.....SE.........R.....T..........W.SGS.VTGT----V...A.....VE    IGLV8-20
IGLVJ64  ....................-----............-.....SAFT--T......V.....L...DE...................................V..........ATF.VDQ.MP--V....Q...    IGLV8-20
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Supplemental Fig. 3 Amino acid sequence alignment of immunoglobulin lambda light chain variable region in equine fetal and adult horse primary lymphoid tissues. Ig lambda light chain nucleotide sequences and their respective translated amino acid sequences were obtained from equine fetal (liver and bone marrow) and adult horse (bone marrow) whole tissues. Alignment of the lambda chain variable region with amino acids identical to the consensus sequence are represented as dots, and residues different from the consensus noted. Gaps in the alignment are represented by dashes. The three CDR regions are indicated above the consensus sequence (Shimanuki et al. 2013; Sun et al. 2010). Sequences from each tissue are ordered based on IGLV gene indicated to the right of each amino acid sequence.

Fetal Liver
Fetal Bone Marrow
Adult Bone Marrow